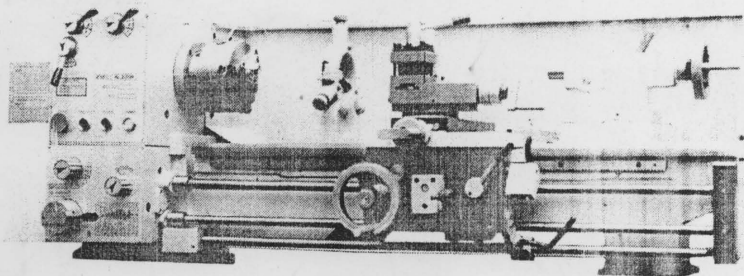


# GEARED – HEAD LATHE

## *Operation Instruction*

MODEL : CQ6230A





## CAUTION

1. WHEN UNPACKING, LATHE ACCESSORIES SHOULD CORRESPOND TO THE ITEM OF PACKING LIST. IF NOT, PLEASE MAKE CONTACT WITH YOUR DEALER.
2. NEVER USING THE MACHINE WITHOUT FIRST READING THE OPERATING INSTRUCTION AND UNDERSTANDING IT'S REQUIREMENTS OF INSTALLING, OPERATING AND ADJUSTING ETC.
3. IF THE MACHINE OPERATING IS NOT ABLE TO BE SATISFIED IN USUAL OPERATING, MAINTENANCE AND WITHIN THE FIXED TIME, PLEASE MAKE CONTACT WITH YOUR DEALER.





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## APPLICATION

The machine is a small scale universal engine lathe. It can perform various turning operation, as well as boring, drilling, grooving and other operations. It can also be used for grinding, reaming, honing and other operations.

The machine is characterized by simple construction, easy operation, large hole in spindle and small hole in the instrument industry and repairing workshop. It is suitable for metal manufacturing in single piece, small and medium batch production.

## TECHNICAL SPECIFICATIONS

1. Main Specifications
  - Max. swing dia. 12" (300mm)
  - Max. swing dia. 17" (430mm)
  - Max. swing over cross slide 7" (175mm)
  - Max. length of workpiece 36" (914mm)
2. Headstock
  - (dia. of spindle) 1 1/2" (38mm)
  - Taper of spindle 5°
  - Range of spindle speeds 1500r/min
3. Change Gear Box
  - Threads which can be cut 16 kinds
  - Saddle feed range per revolution 0.0315-0.268mm/rev
  - Cross feed range per revolution 0.0315-0.268mm/rev
  - Threads per inch 8 T.P.I.
  - Threads per inch 8 T.P.I.
  - Cross feed per division on its dial 0.025mm
  - Threads per inch 8 T.P.I.
  - Tool Post (feed per division on its dial) 0.025mm
4. Tool Post And Saddle
  - Max. turn angle of tool post ±90°
  - Tool slide travel 3" (76mm)

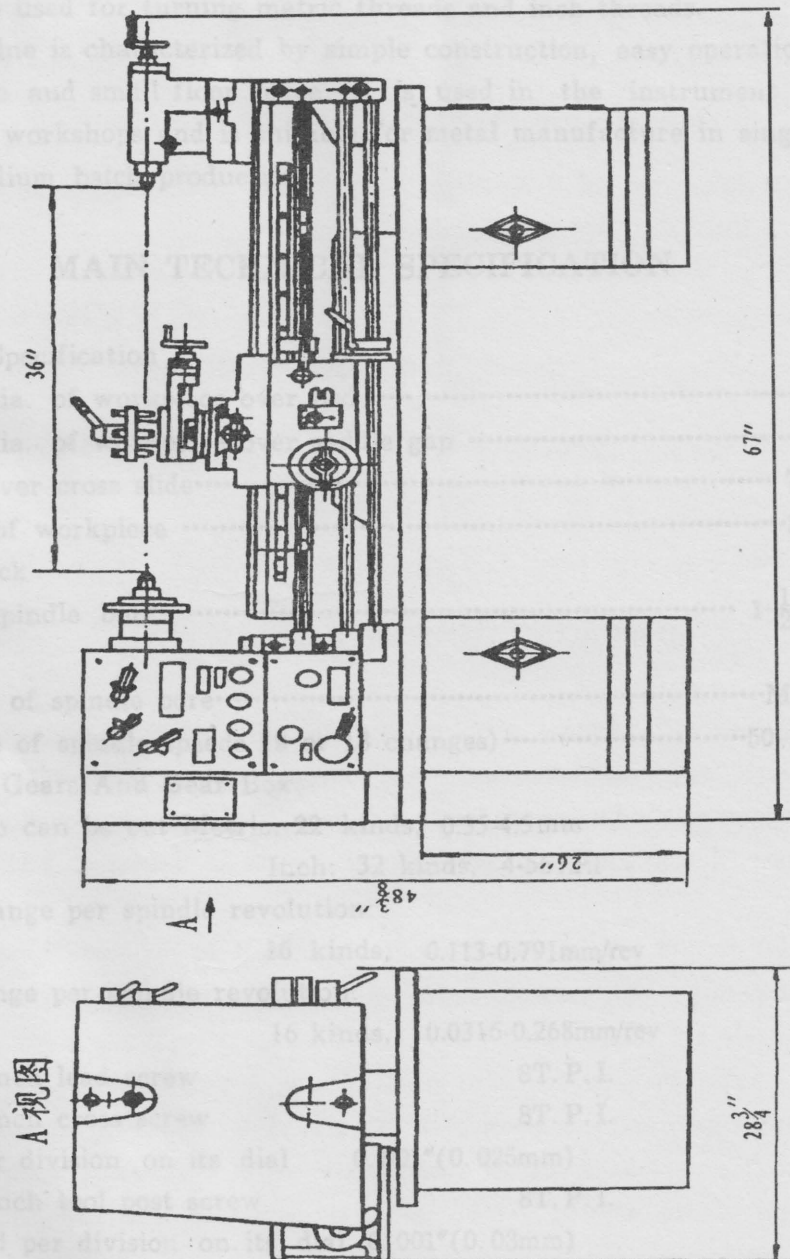


Fig.1 Outside Diagram



## APPLICATION

The machine is a small-scale universal engine lathe. It can perform various turning operation, as well as boring, drilling, grooving and other operations. It can also be used for turning metric threads and inch threads.

The machine is characterized by simple construction, easy operation, large hole in spindle and small floor space. It is used in the instrument industry and repairing workshops and is suitable for metal manufacture in single piece, small and medium batch production.

## MAIN TECHNICAL SPECIFICATION

### 1. Main Specification

Max. swing dia. of workpiece over bed.....12"(300mm)  
Max. swing dia. of workpiece over saddle gap .....17"(430mm)  
Max. swing over cross slide..... 7"(178mm)  
Max. length of workpiece .....36"(900mm)

### 2. Headstock

(dia. of)spindle bore.....  $1\frac{1}{2}$ "(38mm)

Taper of spindle bore.....M. T. No. 5

Range of spindle speeds (9 or 18 changes).....50-1500r. p. m.

### 3. Change Gears And Gear Box

Threads which can be cut Metric: 22 kinds, 0.35-4.5mm

Inch: 32 kinds, 4-56T.P.I

Saddle feed range per spindle revolution:

16 kinds, 0.113-0.791mm/rev

Cross feed range per spindle revolution:

16 kinds, 0.0316-0.268mm/rev

Threads per inch lead screw 8T. P. I.

Threads per inch cross screw 8T. P. I.

Cross feed per division on its dial 0.001"(0.025mm)

Threads per inch tool post screw 8T. P. I.

Tool Post feed per division on its dial 0.001"(0.03mm)

### 4. Tool Post And Saddle

Max. turn angle of tool post  $\pm 90^\circ$

Tool slide travel 3"(76mm)



Cross slide travel	$5\frac{1}{8}$ " (130mm)
Saddle travel	30" (760mm)
5. Tailstock	
Dia. of tailstock quill	$1\frac{1}{4}$ " (32mm)
Taper of tailstock quill bore	M. T. No. 3
Max. travel of tailstock quill	4" (100mm)
6. Motor	
Motor frequency	60 Hz or 50 Hz
Motor horse power	1.5 HP (1.1KW)
Motor rotational speed	1720 R. P. M. or 1420 R. P. M.
Motor voltage	220V/380V 3 phase or 110V/220V 1 phase
7. Lathe size and weight	
Overall dimensions (L × W × H)	
	$67" \times 28\frac{3}{4}" \times 22\frac{3}{8}"$ (1700 × 730 × 570 mm)
	[With stands: $67" \times 28\frac{3}{4}" \times 48\frac{3}{8}"$ (1700 × 730 × 1129 mm)]
Net weight	400 kg
Gross weight	480 kg

## HOISTING AND INSTALLATION

1. After unpacking, count the lathe accessories according to packing list.
2. Remove the paper which covered the unpainted surfaces and using a nonvolatile solvent and brush, thoroughly clean grease which covered surfaces.
3. Sling the machine as shown in the hoisting chart Fig. 2 when it is transporting.
4. The fixed dimension of this machine are shown in the Fig. 3. The machine should be firmly attached to the floor by lathe stands. If you purchases a bench lathe, place the chip tray on top of the bench; mark off the location of the bed mounting holes using a pencil. Then drill the six bolt holes.
5. To maintain accuracy, it is important to keep the bed way leveled. Please use the following procedure: Move the carriage to the headstock end of the bed-way. Place the level in a 90 degree position on top of the cross slide. Loosen the mounting bolts and jack up the base stand(or bed) with adjusting washer to center the bubble in the level. Retighten the mounting bolts. Move the carriage to tailstock end of the bed way and repeat that procedure. After doing that please recheck the headstock end and continue the procedure until both ends of the





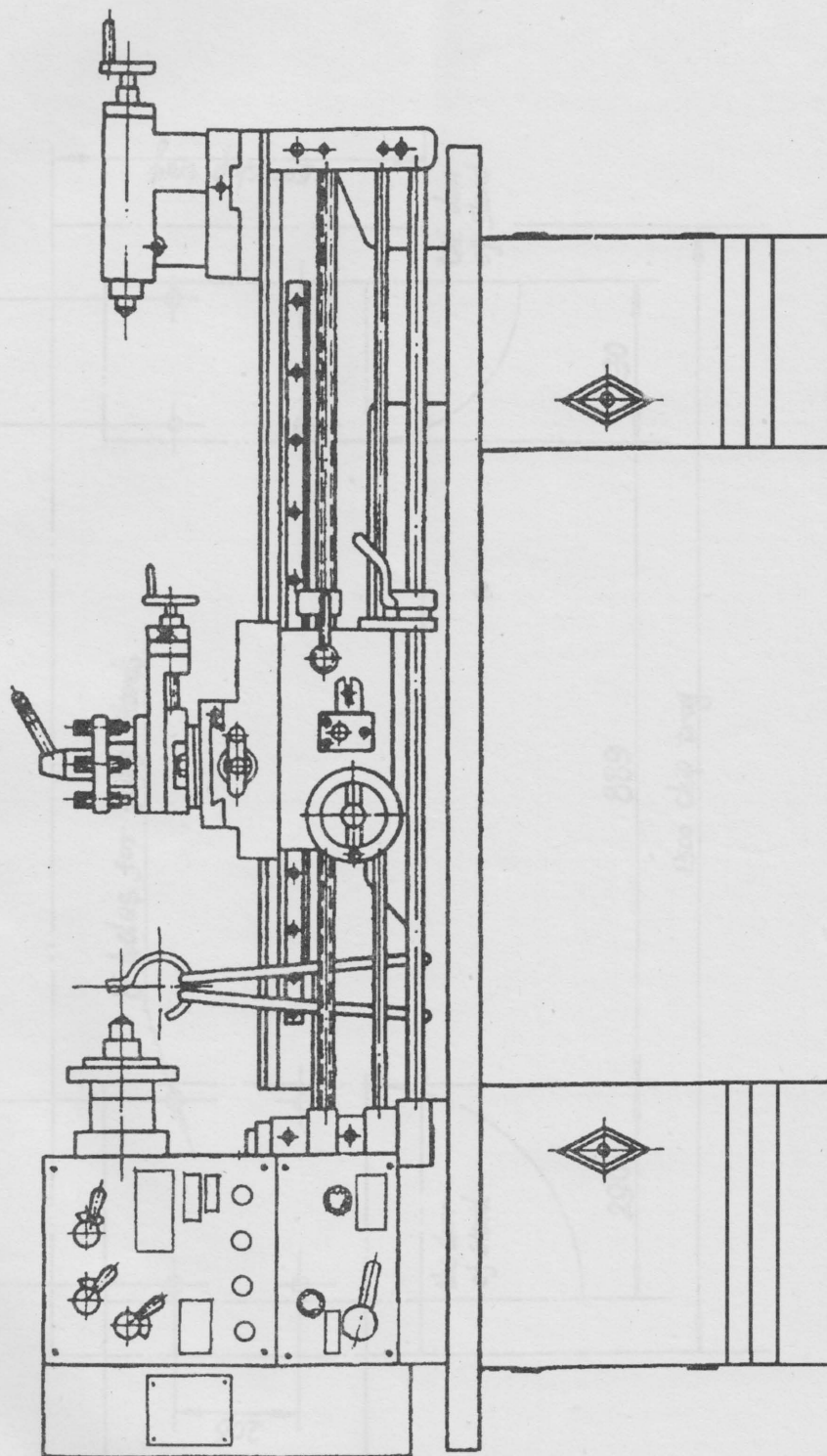


Fig. 2 Hoisting Chat



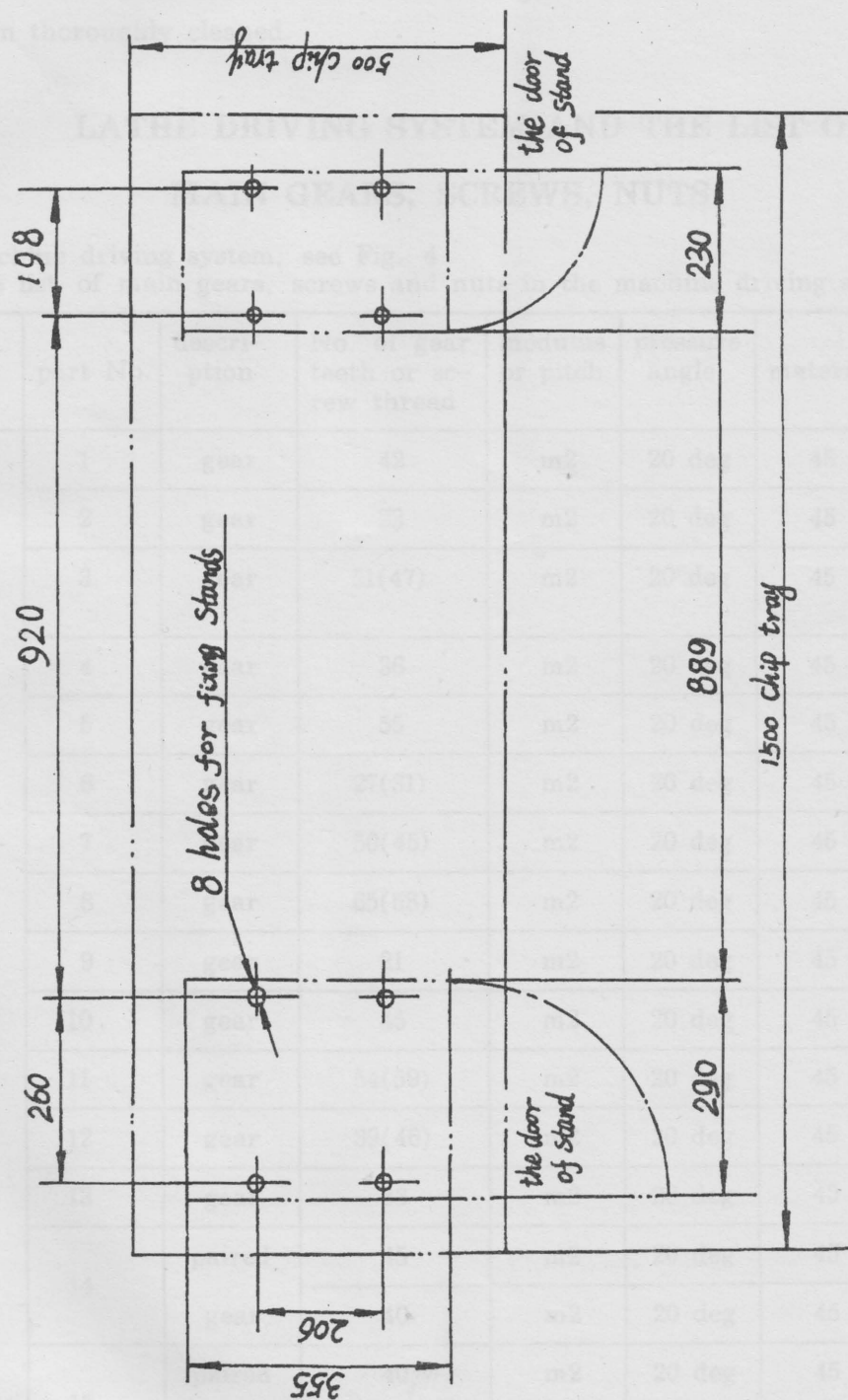


FIG. 3 Fixing dimensions for lathe stand cabinets



bedway are level (the longitudinal tolerance is 0.02/1000 and the cross one is 0.04/1000).

6. During transport and unpacking, it is likely that debris will be present on top of the lathe. Do not move the carriage or tailstock until the bed way has been thoroughly cleaned.

## LATHE DRIVING SYSTEM AND THE LIST OF MAIN GEARS, SCREWS, NUTS

Machine driving system, see Fig. 4

The list of main gears, screws and nuts in the machine driving system

parts	part No.	description	No. of gear teeth or screw thread	modulus or pitch	pressure angle	material	notes
head-stock	1	gear	42	m2	20 deg	45	
	2	gear	23	m2	20 deg	45	
	3	gear	51(47)	m2	20 deg	45	47 teeth gear is used to 18 change speed lathe
	4	gear	36	m2	20 deg	45	
	5	gear	55	m2	20 deg	45	
	6	gear	27(31)	m2	20 deg	45	"
	7	gear	50(45)	m2	20 deg	45	"
	8	gear	65(58)	m2	20 deg	45	
	9	gear	21	m2	20 deg	45	
	10	gear	45	m2	20 deg	45	"
	11	gear	54(59)	m2	20 deg	45	"
	12	gear	39(46)	m2	20 deg	45	
	13	gear	83	m2	20 deg	45	
	14	paired	45	m2	20 deg	45	
		gear	40	m2	20 deg	45	
	15	paired	40	m2	20 deg	45	
		gear	45	m2	20 deg	45	



续表

parts	part No.	description	No. of teeth or thread	modulus or pitch	pressure angle	material	notes
gear-box	16	gear	32	m1.75	20 deg	45	
	17	gear	32	m1.75	20 deg	45	
	18	gear	36	m1.75	20 deg	45	
	19	gear	18	m1.75	20 deg	45	
	20	gear	36	m1.75	20 deg	45	
	21	gear	16	m1.75	20 deg	45	
	22	gear	18	m1.75	20 deg	45	
	23	gear	19	m1.75	20 deg	45	
	24	gear	20	m1.75	20 deg	45	
	25	gear	22	m1.75	20 deg	45	
	26	gear	24	m1.75	20 deg	45	
	27	gear	26	m1.75	20 deg	45	
	28	gear	28	m1.75	20 deg	45	
	29	gear	18	m1.75	20 deg	45	
	30	gear	18	m1.75	20 deg	45	
	31	Paried gear	36	m1.75	20 deg		
			18	m1.75	20 deg	45	
	32	gear	36	m1.75	20 deg	45	
apron	35	gear	11	m2	20 deg	45	
	36	rack		m2	20 deg	45	
	37	lead screw	single thread	8 teeth per inch		45	
	38	half nuts	single thread	8 teeth per inch		ZQSn 6-6-3	





parts	part No.	description	No. of teeth or thread	modulus or pitch	pressure angle	material	notes
apron	39	worm	single thread	m2	20 deg	45	
	40	worm gear	24	m2	20 deg	ZQSn 6-6-3	
	41	gear	12	m2	20 deg	45	
	42	gear	50	m2	20 deg	45	
	43	pinoin	25	m2	20 deg	45	
	44	nut	single thread	8 teeth per inch		ZQSn 6-6-3	lefthand thread
	45	screw	single thread	8 teeth per inch		45	lefthand thread
	46	gear	14	m2	20 deg	45	
	47	gear	51	m2	20 deg	45	
	48	gear	13	m2	20 deg	45	
	49	gear	25	m2	20 deg	45	
	50	gear	48	m2	20 deg	45	
	51	screw	single thread	8 teeth per inch		45	
	52	screw nut	single thread	8 teeth per inch		ZQSn 6-6-3	
tail-stock	53	screw	single thread	10 teeth per inch		45	lefthand thread
	54	nut	single thread	10 teeth per inch		ZQSn 6-6-3	lefthand thread
change gear		gear	49	m1.5	20 deg	45	
		gear	25	m1.5	20 deg	45	
		gear	50	m1.5	20 deg	45	2 pieces
		gear	71	m1.5	20 deg	45	
		gear	80	m1.5	20 deg	HT200	



# BEARING LIST(See Fig 5)

1430 Г.Р.М. (50Hz)  
or 1130 Y.P.M. (60Hz)

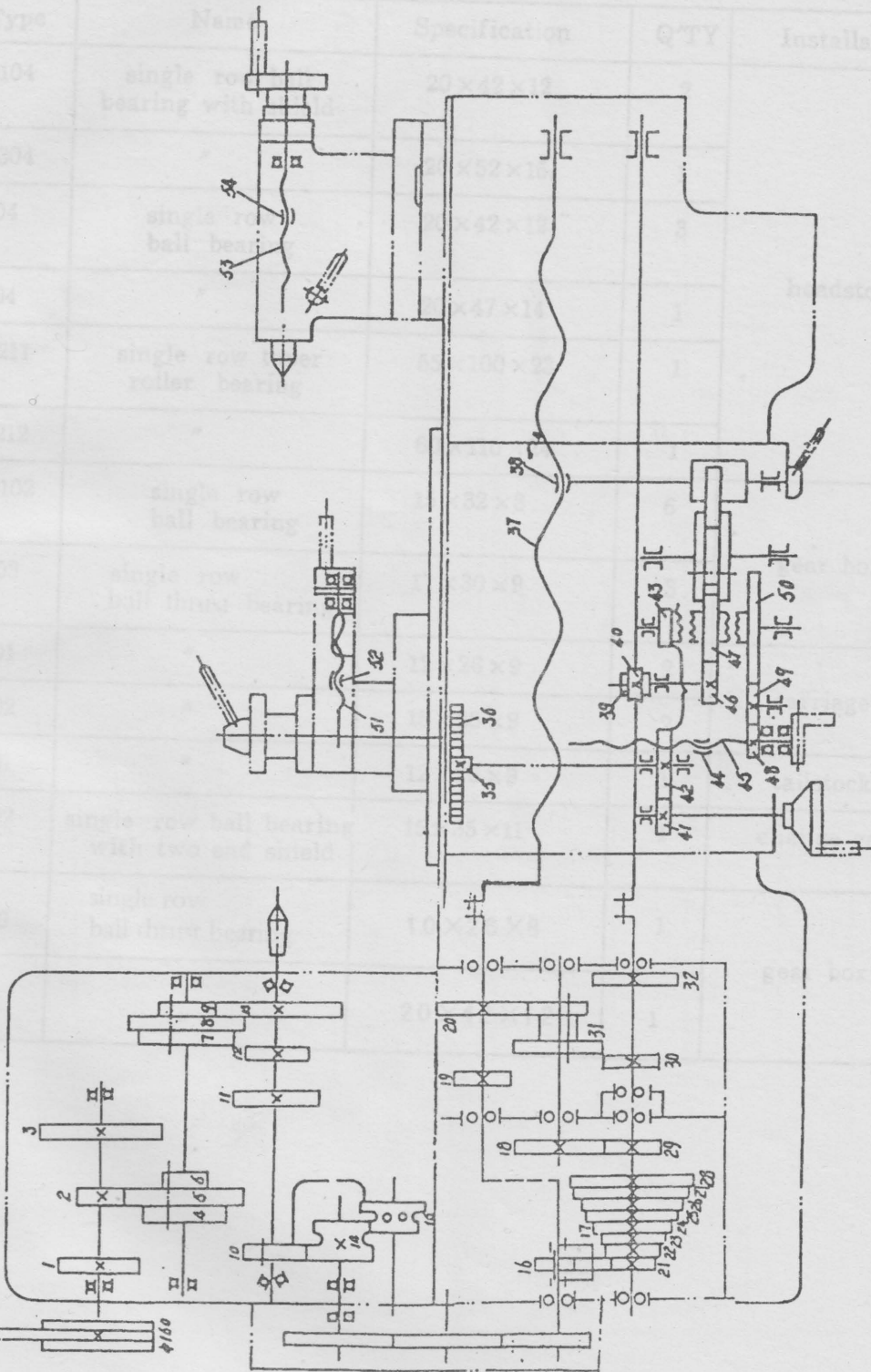
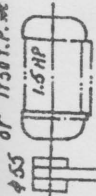


Fig. 4 Driving System



# BEARING LIST(See Fig 5)

Type	Name	Specification	Q'TY	Installation
60104	single row ball bearing with shield	20 × 42 × 12	2	headstock
60304	"	20 × 52 × 15	1	
104	single row ball bearing	20 × 42 × 12	3	
204	"	20 × 47 × 14	1	
D7211	single row taper roller bearing	55 × 100 × 23	1	
D7212	"	60 × 110 × 24	1	
7000102	single row ball bearing	15 × 32 × 8	6	gear box
8103	single row ball thrust bearing	17 × 30 × 9	3	
8101	"	12 × 26 × 9	2	carriage
8102	"	15 × 28 × 9	2	
8101	"	12 × 26 × 9	1	tailstock
80202	single row ball bearing with two end shield	15 × 35 × 11	1	change gear
100	single row ball thrust bearing	10 × 26 × 8	1	gear box
104	"	20 × 42 × 12	1	



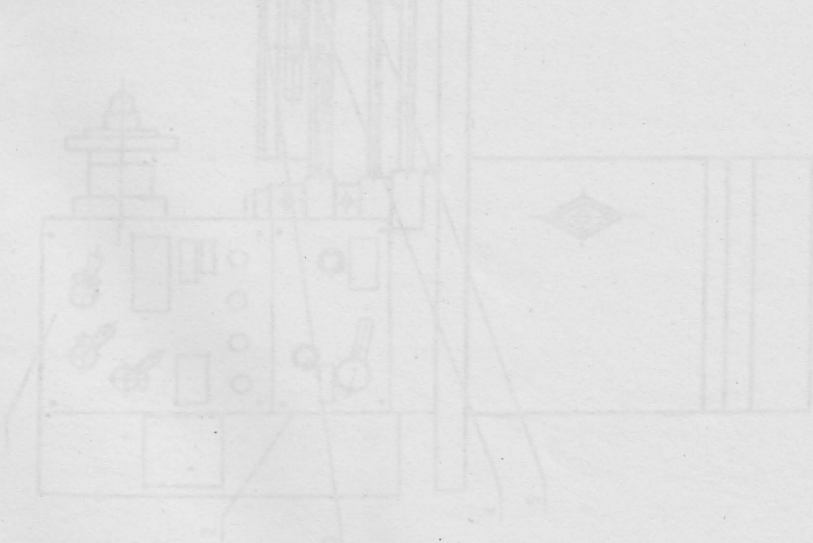






## LUBRICATION

- \* All moving parts and sliding surfaces should be regularly lubricated with clean lubricating oil. Please refer to Fig. 6 for the lubrication holes.
- \* No.1, the cover of headstock, is for headstock lubrication point. Open the cover and fill oil until it reaches the oil-level sight gauge. Running for the first two weeks, or usually for three months, exchange the oil. While exchanging the oil, loosen the oil screw and flow all-out the oil. Then wash the headstock with kerosene etc. and pour clean oil into headstock.
- \* No.2 through 11 are lubrication points (see Fig. 6). They are oiled with oil gun twice a day.
- \* No.2 is the lubrication point for gear box. No.3 for change gear. No.4 for apron. No.5 (two slanting holes) for gear box. No.6(two points) for carriage sliding. No.7 for handwheel. No.8 (two points) for collar of bracket. No.9 for tailstock. No.10 for tool post slide. No.11 for saddle screw.
- \* The other sliding surfaces contain dovetail slot, half nut, worm gear, lead screw, feed rod, handle rod, quill of tailstock etc. They should be oiled before operating and after doing.
- \* Oil recommendations: a. For headstock and feedbox; Mobil D.T.E. light. b. For all other applications; Mobil Vactra No.2.





# ELECTRICAL DOCUMENT CATALOGUE

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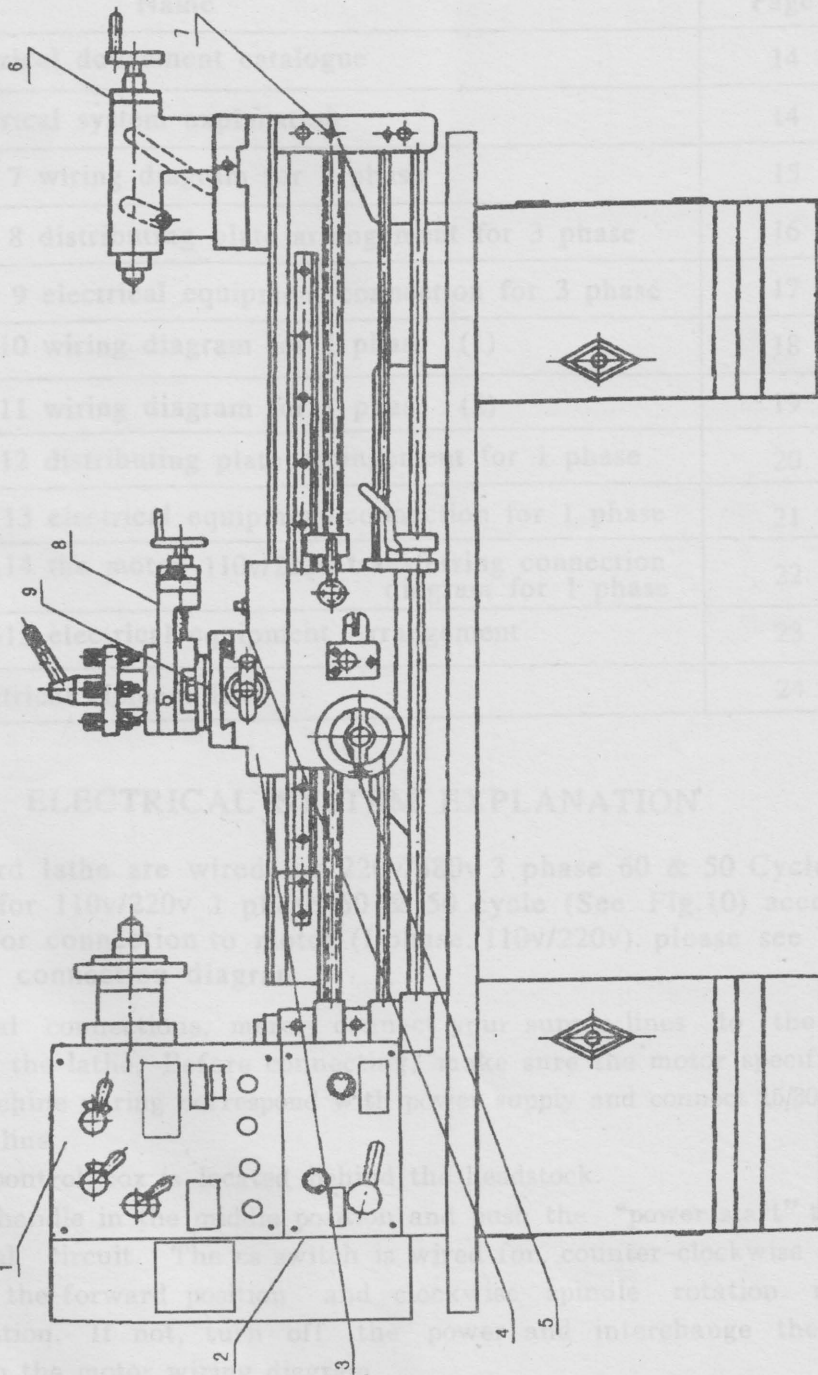


Fig. 6 Lubrication Chart

## ELECTRICAL PLANATION

The standard lathes are wired for 3 phase 60 & 50 Cycle (See Fig. 7) or for 110v/220v 1 phase 60 cycle (See Fig. 10) according to order. For connection to 110v/220v, please see Fig. 16 transferring connection.

For electrical connection, the leads provided on the machine must be connected to the supply and connected into power line.

- Electrical connection must be made to the machine.
- Put the control handle in the "forward" position. The "reverse" knob will open the circuit. Pushing the knob "reverse" will stop the machine. Pushing the knob "forward" will start the machine.
- Putting control handle in the middle position can stop the machine. Pushing the knob "reverse" will open the circuit.
- The machine must be connected to ground or ground wire.



## ELECTRICAL DOCUMENT CATALOGUE

No.	Name	Page
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5	Fig. 9 electrical equipment connection for 3 phase	17
6	Fig.10 wiring diagram for 1 phase (1)	18
7	Fig.11 wiring diagram for 1 phase (2)	19
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## ELECTRICAL SYSTEM EXPLANATION

- \* The standard lathe are wired for 220v/380v 3 phase 60 & 50 Cycle [See Fig. 7] or for 110v/220v 1 phase 60 & 50 cycle (See Fig.10) according to order. For connection to motor (1 phase. 110v/220v). please see Fig.14 transferring connection diagram.

For electrical connections, merely connect your supply lines to the leads provided on the lathe. Before connecting, make sure the motor specification and the machine wiring correspond with power supply and connect 15/30A fuse into power line.

- \* Electrical control box is located behind the headstock.
- \* Put the cs handle in the middle position and push the "power start" to close the electrical circuit. The cs switch is wired for counter-clockwise spindle rotation in the forward position and clockwise spindle rotation in the reverse position. If not, turn off the power and interchange the leads according to the motor wiring diagram.
- \* Putting cs-handle in the middle position can stop the machine. Pushing the knob "reset" will open the circuit.
- \* The machine must be connected to ground or ground wire.



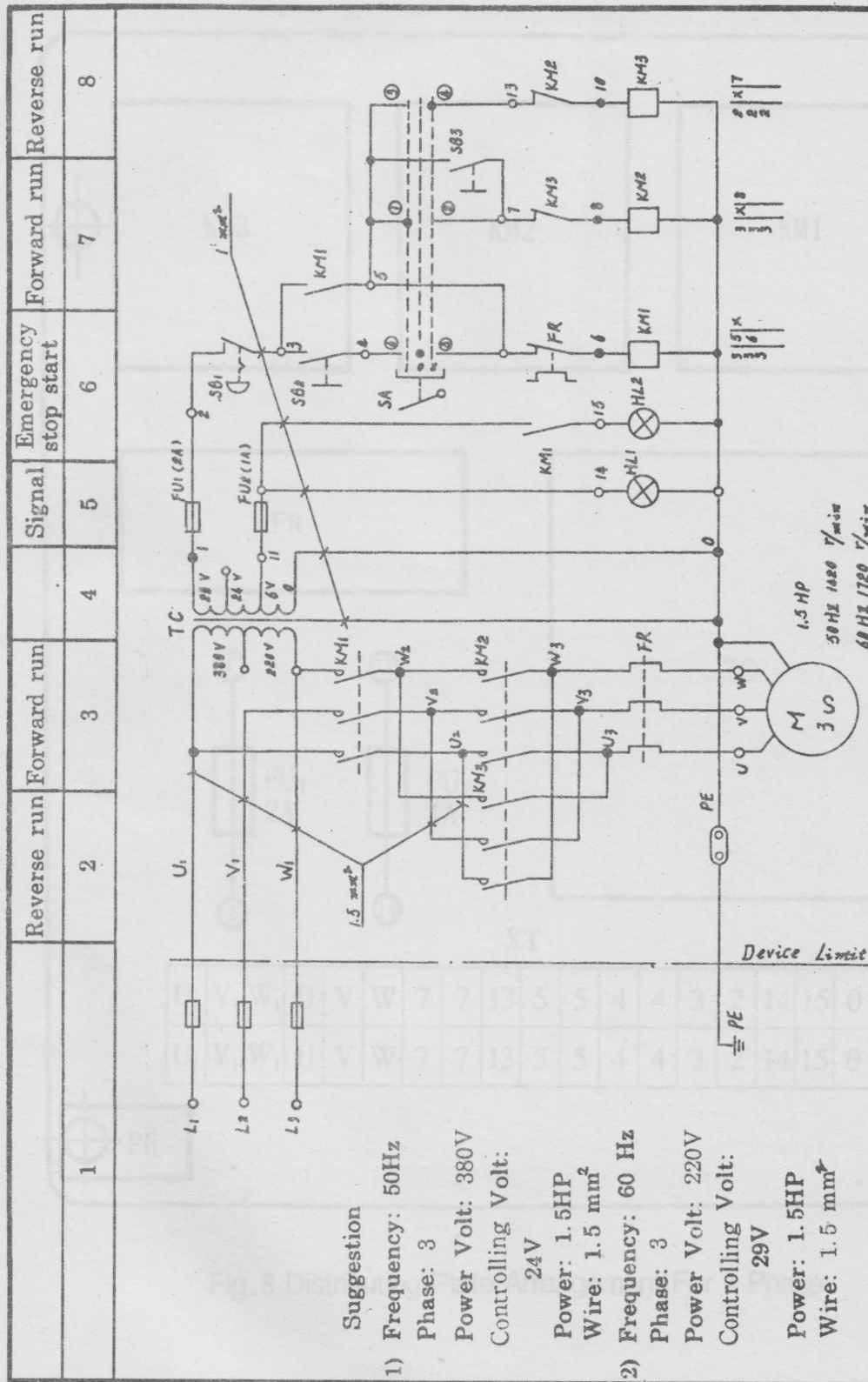


Fig. 7 Wiring Diagram For 3 Phase





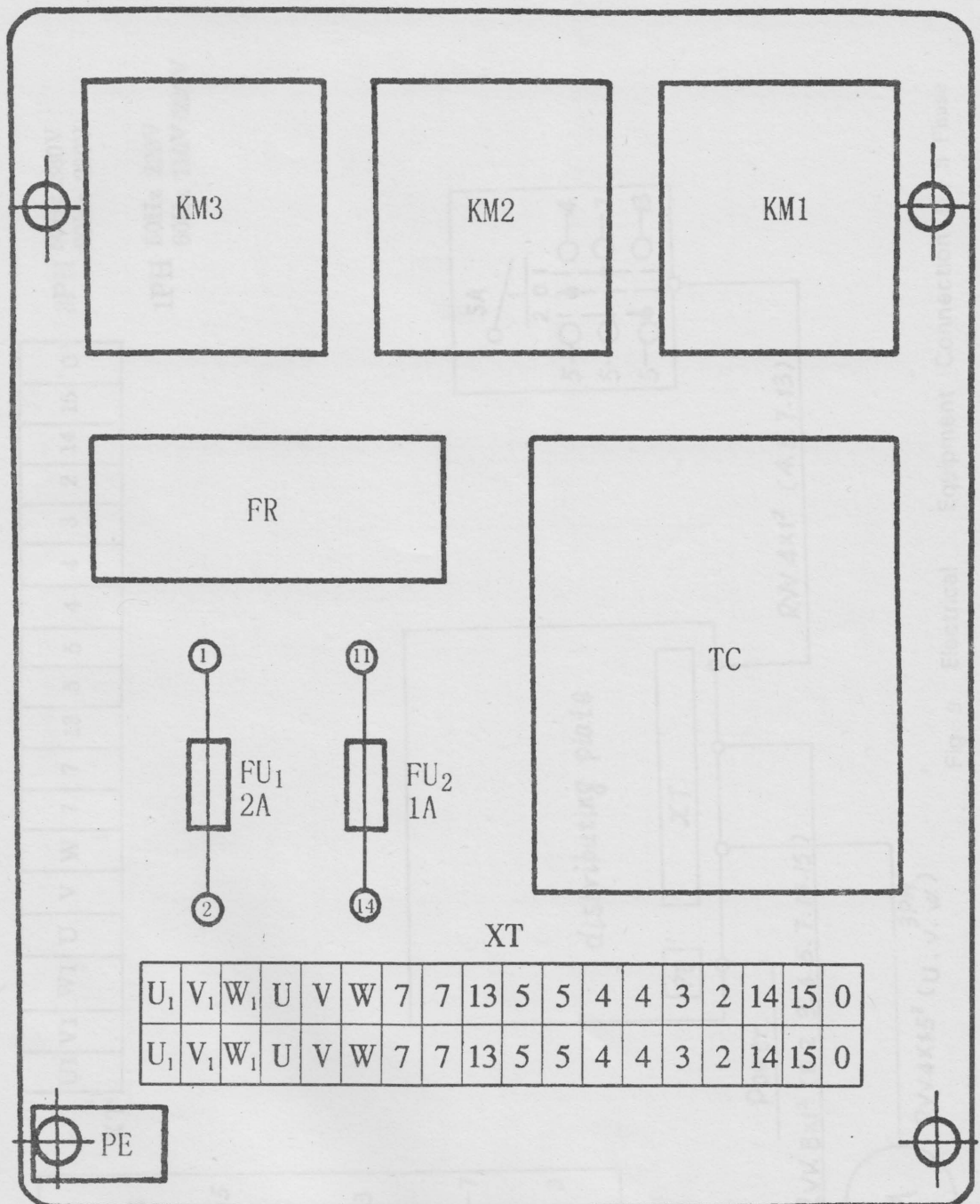


Fig.8 Distributing Plate Arrangement For 3 Phase



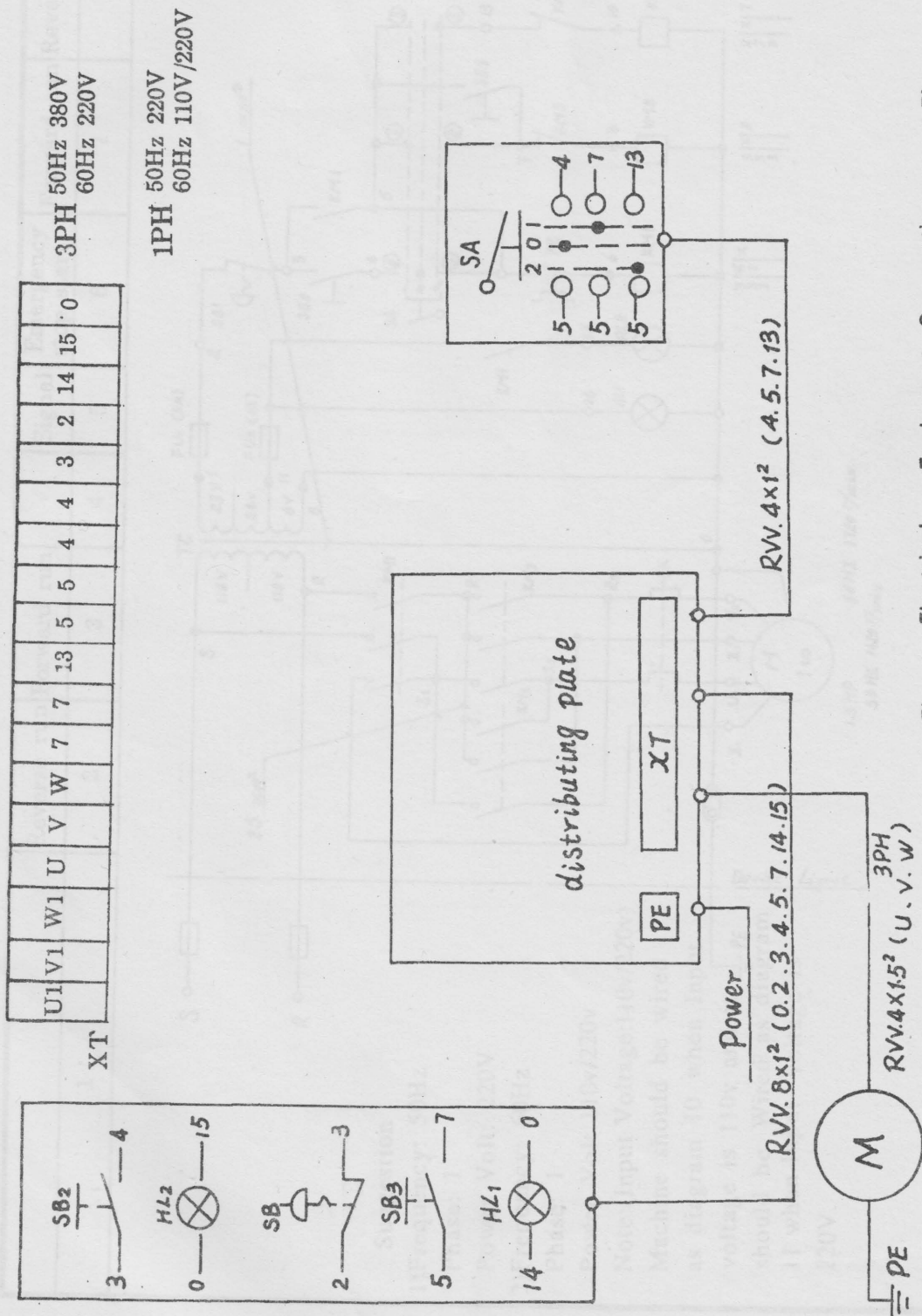


Fig. 9 Electrical Equipment Connection For 3 Phase













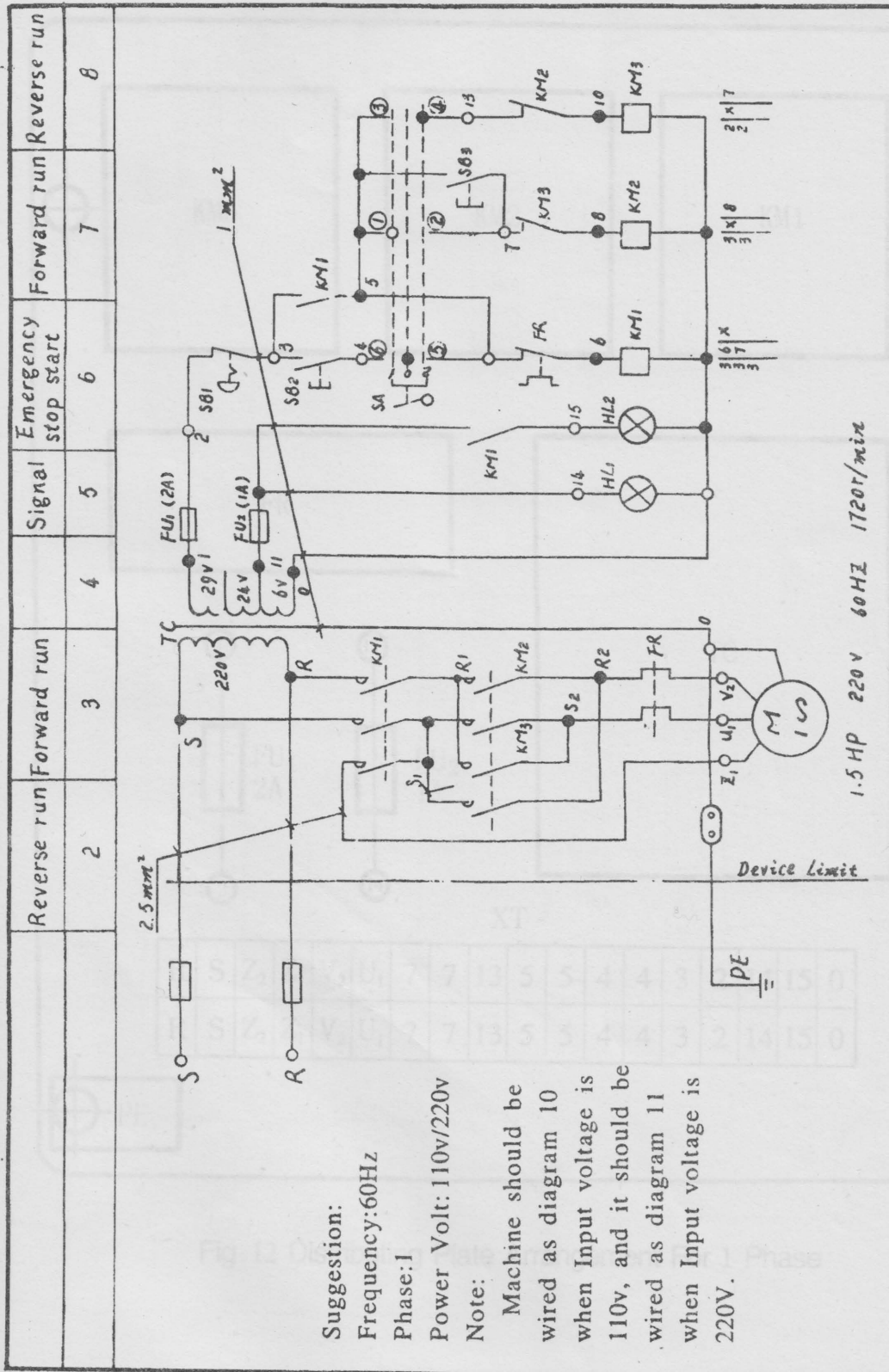


Fig. 11 Wiring Diagram For 1 Phase (2)



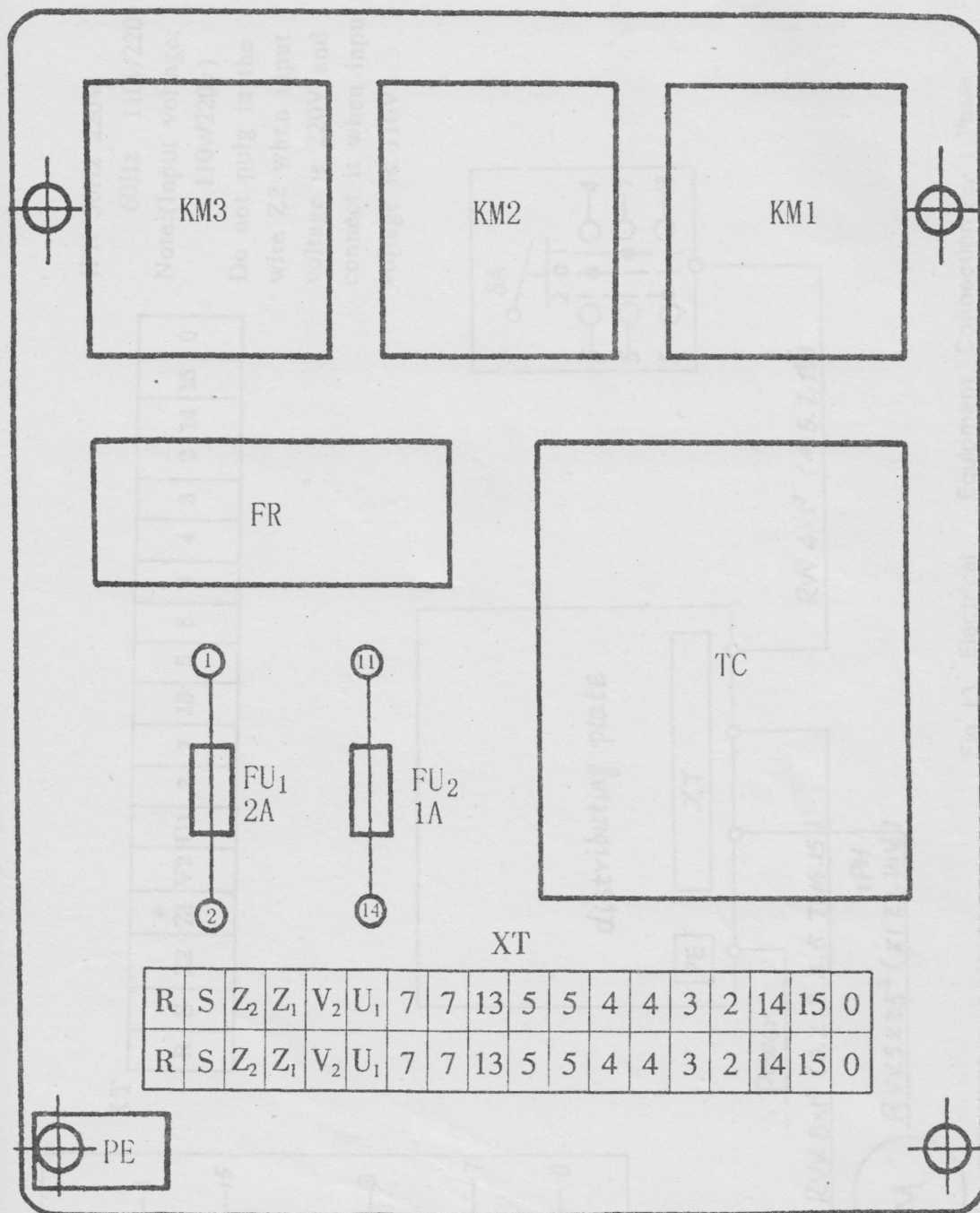


Fig. 12 Distributing Plate Arrangement For 1 Phase



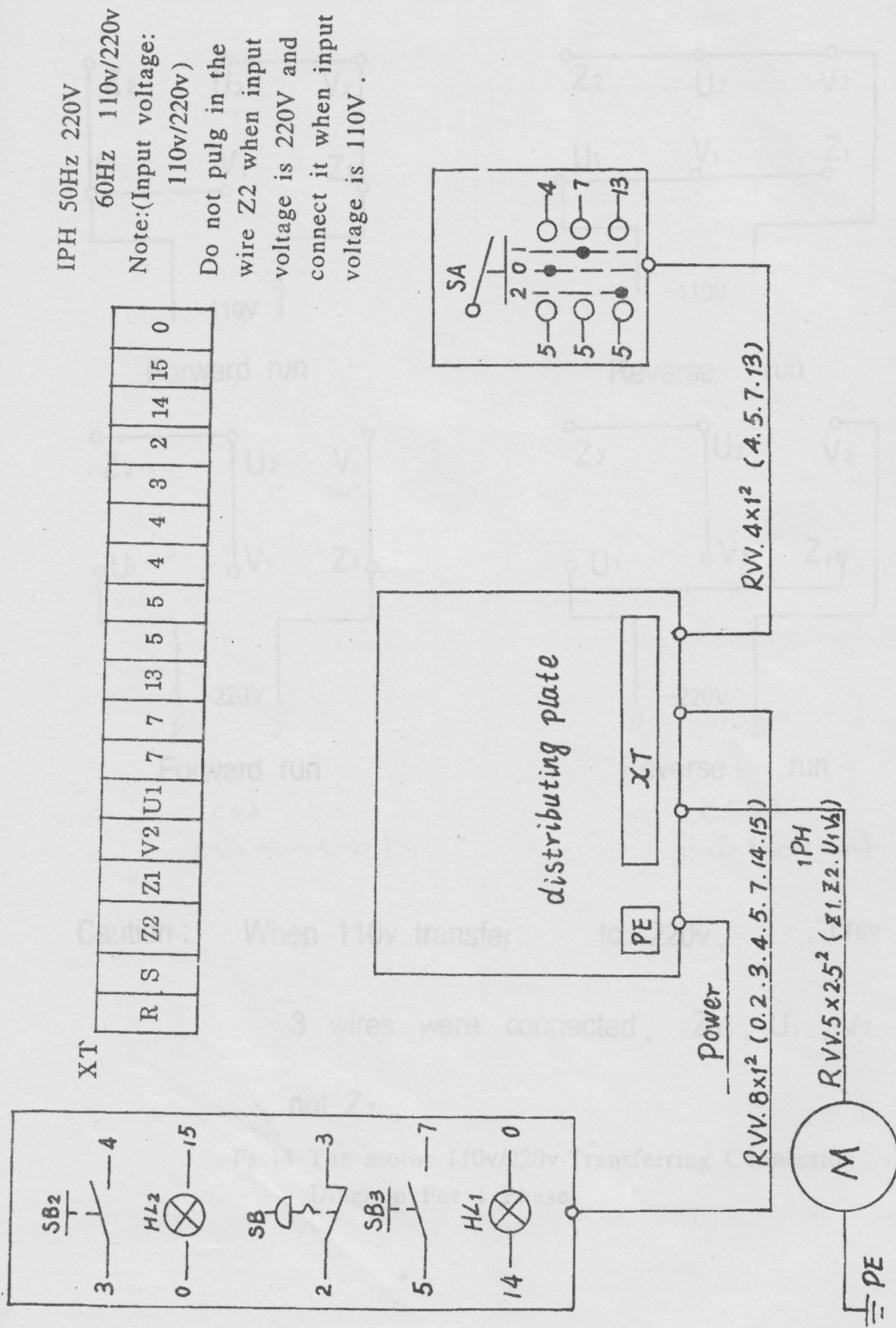
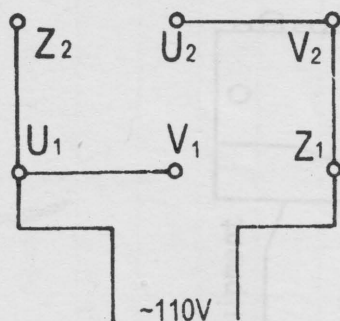
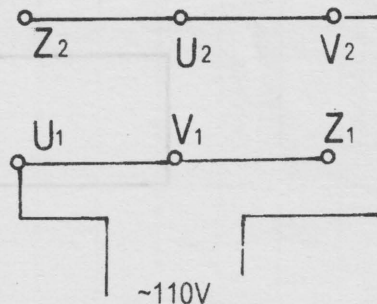


Fig. 13 Electrical Equipment Connection For 1 Phase

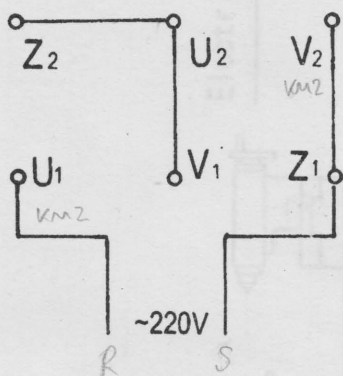




Forward run

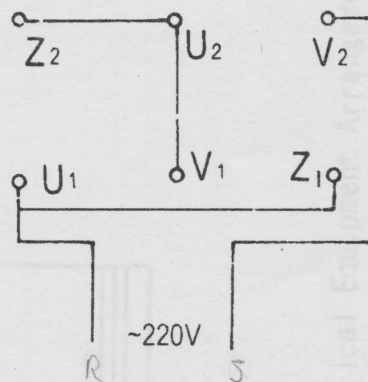


Reverse run



Forward run

*cw  
(shaft toward you)*



Reverse run

*ccw  
(shaft toward you)*

Caution : When 110v transfer to 220v , only

3 wires were connected ,  $Z_1$  ,  $U_1$  ,  $V_2$

not  $Z_2$  ,

Fig.14 The motor 110v/220v Transferring Connection Diagram For 1 Phase





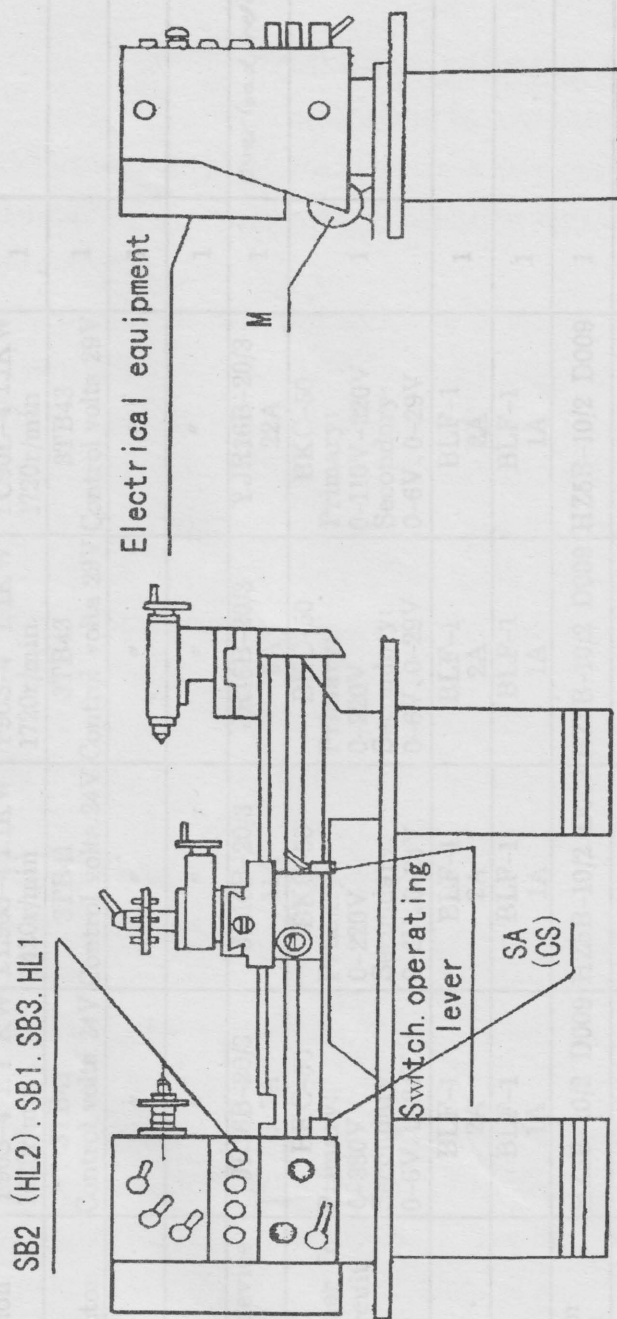


Fig. 15 Electrical Equipment Arrangement



Symbol	Name	Type				Quantity	Note
		Phase 3, 50Hz, 380V	Phase 1, 50Hz, 220V	Phase 3, 60Hz, 220V	Phase 1, 60Hz, 110V/220V		
M	Induction Motor	Y90S-4 1.1 KW 1420r/min	YL90S-4 1.1KW 1420r/min	Y90S-4 1.1KW 1720r/min	YC90L-4 1.1KW 1720r/min	1	
KM1	AC Contactor	3TB41 Control volta 24V	3TB41 Control volta 24V	3TB43 Control volta 29V	3TB43 Control volta 29V	1	
KM2	"	"	"	"	"	1	
KM3	"	"	"	"	"	1	
FR	Heating device relay	JR16B-20/3 3.5A	JR16B-20/3 11A	JR16B-20/3 5A	YJR16B-20/3 22A	1	Overload relay
TC	Transformer for Contol circuit Supply	BKC-50 Primary: 0-380V Secondary: 0-6V, 0-24V	BKC-50 Primary: 0-220V Secondary: 0-6V, 0-24V	BKC-50 Primary: 0-220V Secondary: 0-6V, 0-29V	BKC-50 Primary: 0-110V-220V Secondary: 0-6V, 0-29V	1	
FU1	Fuse	BLF-1 2A	BLF-1 2A	BLF-1 2A	BLF-1 2A	1	
FU2	"	BLF-1 1A	BLF-1 1A	BLF-1 1A	BLF-1 1A	1	
SA (CS)	Selector Switch	HZ5B-10/2 D009	HZ5B-10/2 D009	HZ5B-10/2 D009	HZ5B-10/2 D009	1	
SB1	Reset	LAY3-01 ZS/1	LAY3-01 ZS/1	LAY3-01 ZS/1	LAY3-01 ZS/1	1	
SB2	Power start	LA19-11D Green	LA19-11D Green	LA19-11D Green	LA19-11D Green	1	Voltage for Lamp 6.3 V
SB3	Inching	LA19-11 Black	LA19-11 Black	LA19-11 Black	LA19-11 Black	1	
HL	Indicator lamp	XD-1 White	XD-1 White	XD-1 White	XD-1 White	1	Voltage for Lamp 6.3 V

Electrical Element List

Siemens 3TB41 contactor now replaced by 3TF41

2 NO + 2 NC  
auxiliary  
contacts



## **Trial drive, adjusting and operating instruction**

1. Before operating the machine, read this operating instruction and understanding it's requirement of adjusting, operating, maintenance and lubrication etc.
2. The machine is equipped with 1 or 2 V-belts from the motor to the low rear pulley. It is advisable to check the tension before starting the machine. The belts should be depressed about 1/2 inch by normal finger pressure. Tight belt will ruin the bearing. Adjust the tension, if necessary.
3. When trial driving, set changing lever on the Lowest speed and let the speed step by step until the highest speed (then the feed lever in the middle rate) each step operating for over 5 minutes.
4. Machine Operating Lever. See Fig.16

### **Headstock**

\* With the help of lever (1), (2) and V-belts the headstock can provide 18 or 9 step speeds from 50 to 1500 r. p. m as shown in "spindle speed chart" located on the front side of headstock (See fig.17)

\* Starting & stopping of spindle can be made merely by the starting lever (11). Moving the lever (11) up, the spindle will be counter-clockwise rotation; starting lever (11) down, the spindle will be reverse rotation.

### **Quick Change Gear Box**

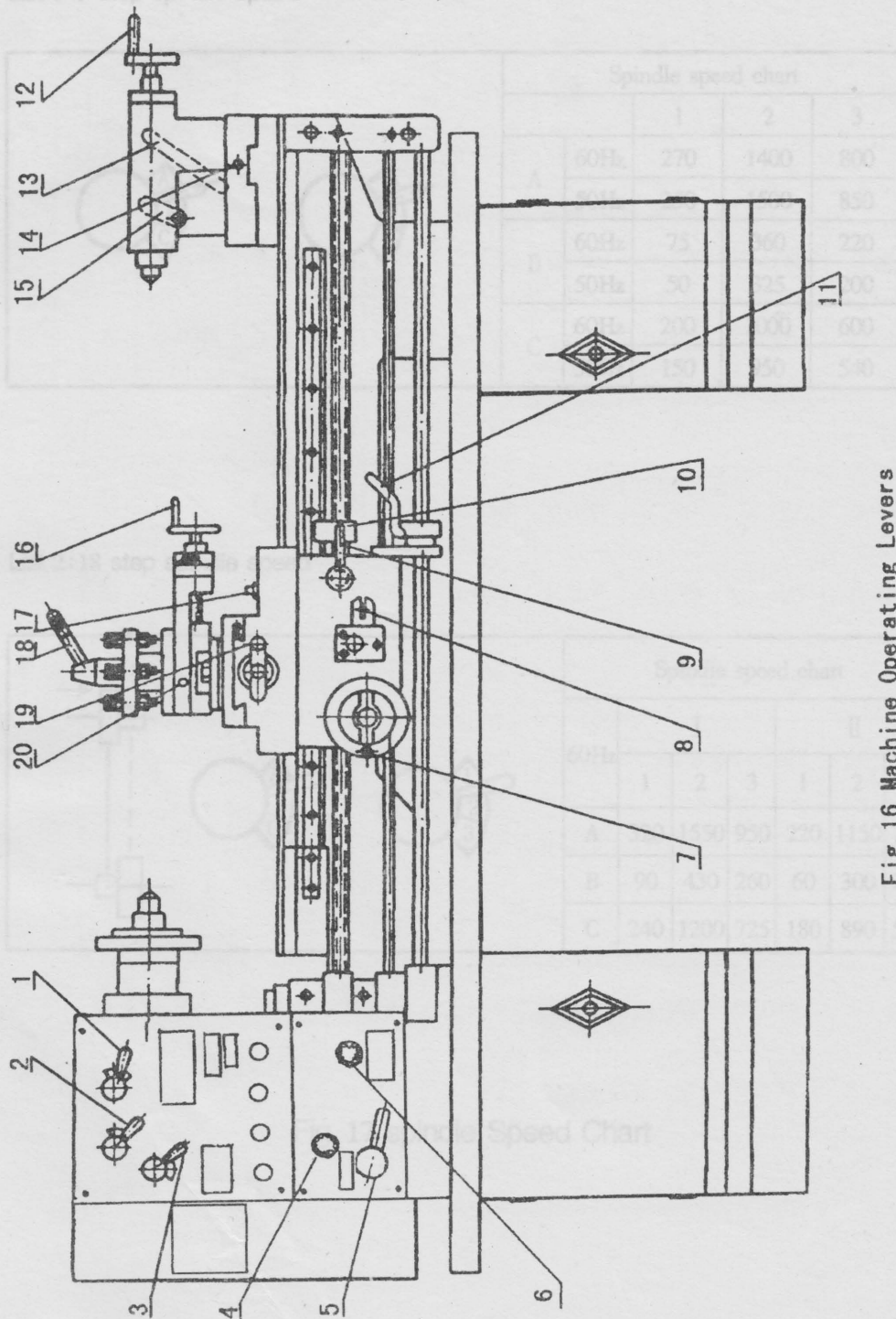
\* Lever (6) and lever (4) are selecting lever of threading or feed. Lever (6) has four positions, "G" "E" positions are for feeding rod, "F" "D" are for lead screw. Lever (4) has eight positions. You can change the position of Lever (4) and Lever (6) to provide all kinds of feeding rates (See Fig .18) and thread range (See Fig .19). To change the Lever (4), you must unlock the Lever (5) first, after finishing you must lock it .

Caution: Always stop the spindle before engaging any of above 3 levers.

### **Carriage Assembly**



List 1-9 step spindle speed







List 1:9 step spindle speed

		Spindle speed chart		
		1	2	3
A	60Hz	270	1400	800
	50Hz	250	1500	850
B	60Hz	75	360	220
	50Hz	50	325	200
C	60Hz	200	1000	600
	50Hz	150	950	540

List 2:18 step spindle speed

		Spindle speed chart					
		I			II		
60Hz		1	2	3	1	2	3
A		320	1550	950	220	1150	700
B		90	430	260	60	300	200
C		240	1200	725	180	890	525

Fig.17 spindle Speed Chart

Fig. 18







50		1	2	3	4	5	6	7	8
	FEEDING  inch/								
	G	0.0078	0.0069	0.0066	0.0062	0.0057	0.0052	0.0048	0.0045
	E	0.0311	0.0277	0.0262	0.0249	0.0226	0.0207	0.0191	0.0178
	FEEDING  mm/								
	G	0.197	0.176	0.166	0.158	0.144	0.131	0.121	0.113
50	E	0.790	0.704	0.665	0.632	0.574	0.526	0.485	0.452
	FEEDING  inch/								
	G	0.0027	0.0024	0.0023	0.0022	0.0020	0.0018	0.0017	0.0016
	E	0.0110	0.0098	0.0092	0.0088	0.0080	0.0073	0.0067	0.0063
	FEEDING  mm/								
	G	0.070	0.062	0.059	0.056	0.051	0.046	0.043	0.040
71	E	0.278	0.248	0.234	0.223	0.202	0.185	0.171	0.159

Fig. 18







- \* Handwheel (7) is used for manually moving the carriage along the bedway.
- \* crossfeed crank (19) is used to manually move the cross slide in or out.
- \* Compound slide crank (16) is used to manually move the tool post. The compound is fully adjustable to any angle and is also used for threading or machining an angle on the workpiece.
- \* Starting/stopping lever (11) is used to control the spindle direction of rotating, either forward or reverse.
- \* Thread lever (9) is used to engage the half nuts when threading.
- \* Feed lever (8) is used to engage either the longitudinal or cross feed. This lever has a safety interlock to prevent accidental engagement of the half nuts when the lathe is in feed mode. There are three positions: Center or disengaged position. Upper position engages the power longitudinal feed. Lower position engages the power cross feed.
- \* The lead/feed lever (3) is used to change the direction of either longitudinal or cross feed in remaining the same spindle rotation.
- \* Thread cutting dial (10) is used to engage the half nuts with the leadscrew in the same thread that has been previously cut. Please note, Use any line of the dial for even pitches of threads; but you must use the same starting line for odd pitches of threads. i.e. when cutting a shaft with 10 T.P.I, engage the half nuts at any number on the thread dial; when cutting an odd pitches, if you start the cut using a 1 or a 3, continue to use the 1 or the 3 until the thread is finished.
- \* The clamp lever (18) is used to secured tool post against loosening. Loosening the Lever, the tool post can rotate counter-clockwise to change cutting tools.
- \* Saddle lock screw (17) is used to firmly clamp saddle to bed way.
- \* Compound slide screw (20) is used to clamp compound slide to saddle.

### **Tailstock**

- \* The handwheel (12) is used to feed or retreat the quill. Turning the handwheel in counter-clockwise until a full stop is reached will automatically eject the tool being used.
  - \* The tailstock clamp lever (13) locks the tailstock to the bedway. To lock, put the lever up. To release, put it down.
  - \* The quill lock lever (15) prevent the quill from moving. Before operating the handwheel (12), release the lever. Feeding the quill to desired position, lock it.
  - \* Two set screws (14) on either side of the base is used to offset the tailstock. After taper adjustment is made, retighten both screws
5. See the Fig. 21 Adjust the clearance of cross feed nuts on the saddle as following.





ISO702 /11-1376)

When mounting, pull the three pull pins (1) and the chuck or face plate into the three holes (See Fig. 22). Then turn the three cams (See, Fig. 22) clockwise the chuck or face plate can be detached. When turning the cams counter-clockwise the chuck or face plate can be detached.

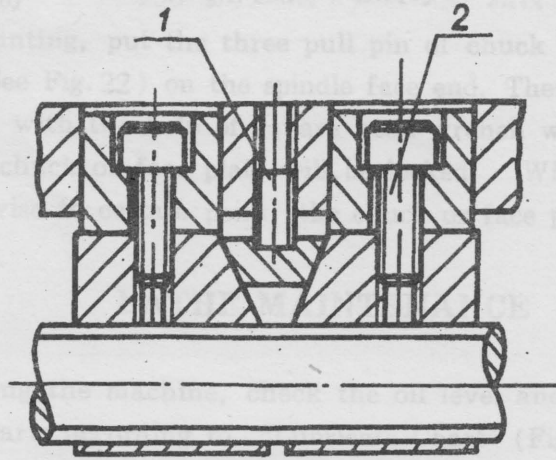


Fig.21 Adjust the clearance of cross feed nuts

Loose 2-M6 screw (2) then rotate the screw (1) down until the slide moves with a slight drag. Last, retighten the 2-M6 screws.

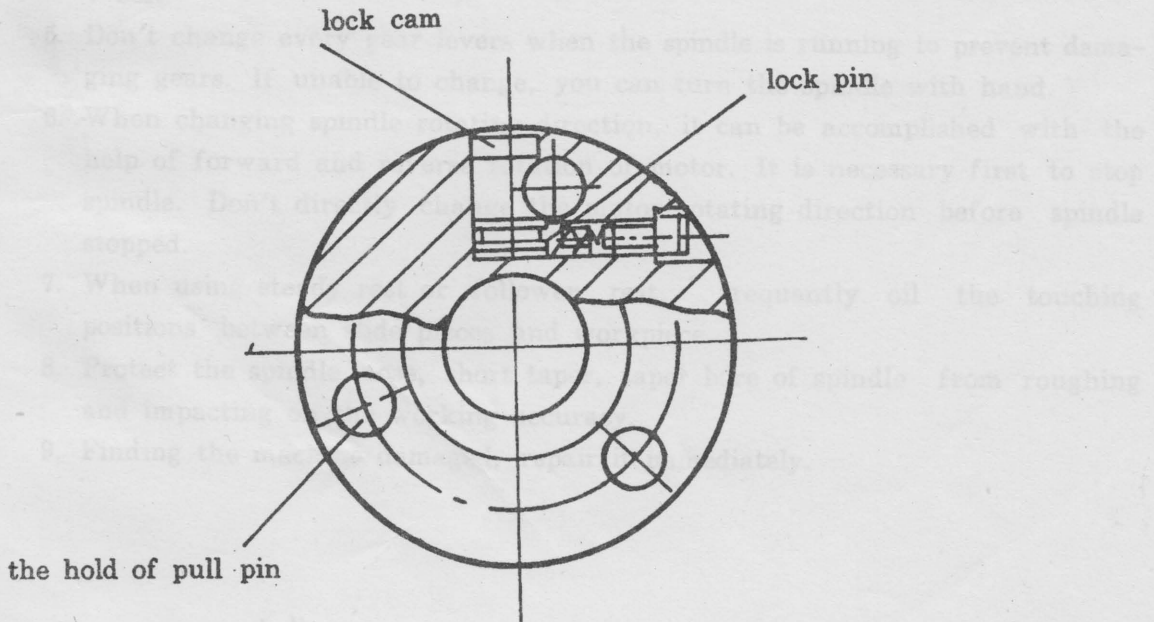


Fig. 22 chuck or face plate lock structure

6. See the Fig. 22 , the Mounting and detaching of chuck or face plate. The connection between spindle and chuck or face plate is made by type D cam lock structure according to china national Standard GB5900.3-86(similar to



*N.B. to dismount, chuck may need tapping on a lever b/w chuck & gearbox to break seizure.*

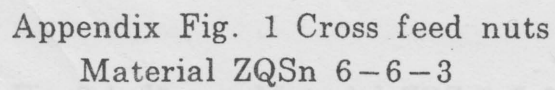
When mounting, put the three pull pin of chuck or face plate into the three holes (See Fig. 22) on the spindle face end. Then turn the three cams (See, Fig. 22) with the help of square head wrench when turning the cams clockwise the chuck or face plate will be locked. When turning the cams counter-clockwise to certain point, the chuck or face plate can be detached.

## LATHE MAINTENANCE

1. Before operating the machine, check the oil level and lubricate all sliding and rotating parts according to "Lubricate Chart" (Fig. 6)
2. Always clean every sliding surfaces to prevent the chips. Often check the felt element on each end of the saddle. If being damaged, wash or change it. After operating, clean every parts of the machine and oil each slide surfaces, leadscrew, feed rod etc. to avoid rusting.
3. Periodically wash headstock, gear box, apron and change oil.
4. Keep oil from falling on the motor and v-belt. Periodically check and adjust v-belt.
5. Don't change every gear levers when the spindle is running to prevent damaging gears. If unable to change, you can turn the spindle with hand.
6. When changing spindle rotating direction, it can be accomplished with the help of forward and reverse rotation of motor. It is necessary first to stop spindle. Don't directly change the motor rotating direction before spindle stopped.
7. When using steady rest or follower rest, frequently oil the touching positions between slide pieces and workpiece.
8. Protect the spindle nose, short taper, taper bore of spindle from roughing and impacting on the working accuracy.
9. Finding the machine damaged, repair it immediately.

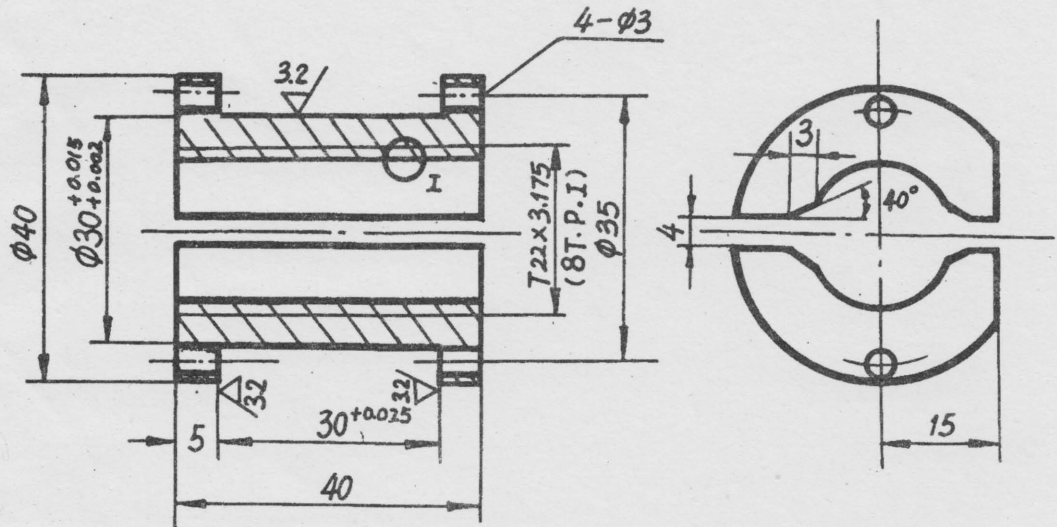


the rest 12.5/  
▽

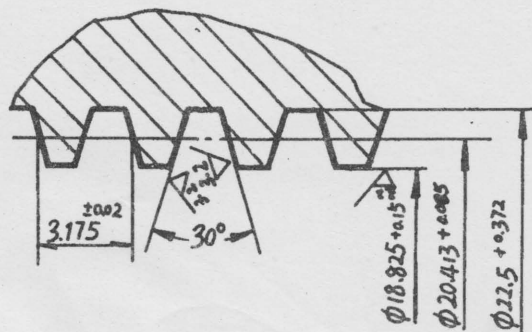




the rest 12.5



$\frac{1}{M4:1}$



Appendix Fig.2 half nut Material ZQsr6-6-3







